

AVERAGES

1. Average (A) = $\frac{\text{Sum of Quantities (S)}}{\text{No. of Quantities (N)}}$

$$S = N \times A$$

$$N = \frac{S}{A}$$

2. 1 to n, consecutive 'n' natural numbers

$$S = \frac{n(n+1)}{2}$$

$$N = n$$

$$A = \frac{n(n+1)}{2 \times n}$$

$$A = \frac{n+1}{2}$$

$$= \frac{\text{Last no.} + 1}{2}$$

$$A = \frac{\text{Last no.} + \text{First no.}}{2}$$

3. 1 to n, consecutive 'n' odd numbers

Eg:- 1, 3, 5, 7, 9 $\rightarrow$ Total 5 no's = n

$$A = \frac{25}{5} = 5$$

$$\boxed{A = n}$$

4. 1 to n, consecutive 'n' even numbers

Eg:- 2, 4, 6, 8, 10

$$A = \frac{30}{5} = 6$$

5. Any consecutive 'n' natural numbers

No. of numbers = odd

Eg:- 50, 51, 52, 53, 54

Average = 52

6. Any consecutive, 'n' natural numbers

No. of numbers = even

Eg:- 50, 51, 52, 53, 54, 55

A = 52.5

7. Combined or Group or weighted average

$n_1 \rightarrow x_1$

$n_2 \rightarrow x_2$

$n_3 \rightarrow x_3$

$\vdots$

$$A = \frac{n_1 x_1 + n_2 x_2 + n_3 x_3 + \dots}{n_1 + n_2 + n_3 + \dots}$$

P.9 NO:- 67

Grand parents	parents	Grand children
A = 67 years	A = 35 years	A = 6 years
N = 2	N = 2	N = 3

$$A = \frac{67 \times 2 + 35 \times 2 + 6 \times 3}{2 + 2 + 3}$$

$$= 31 \frac{5}{7} \text{ years}$$

Sunday	Other days
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A = 510

A = 240

N = ?

N = ?

$$A = \frac{510 \times 5 + 240 \times 25}{30}$$

$$= 285$$

1 - Sunday,
7 - days

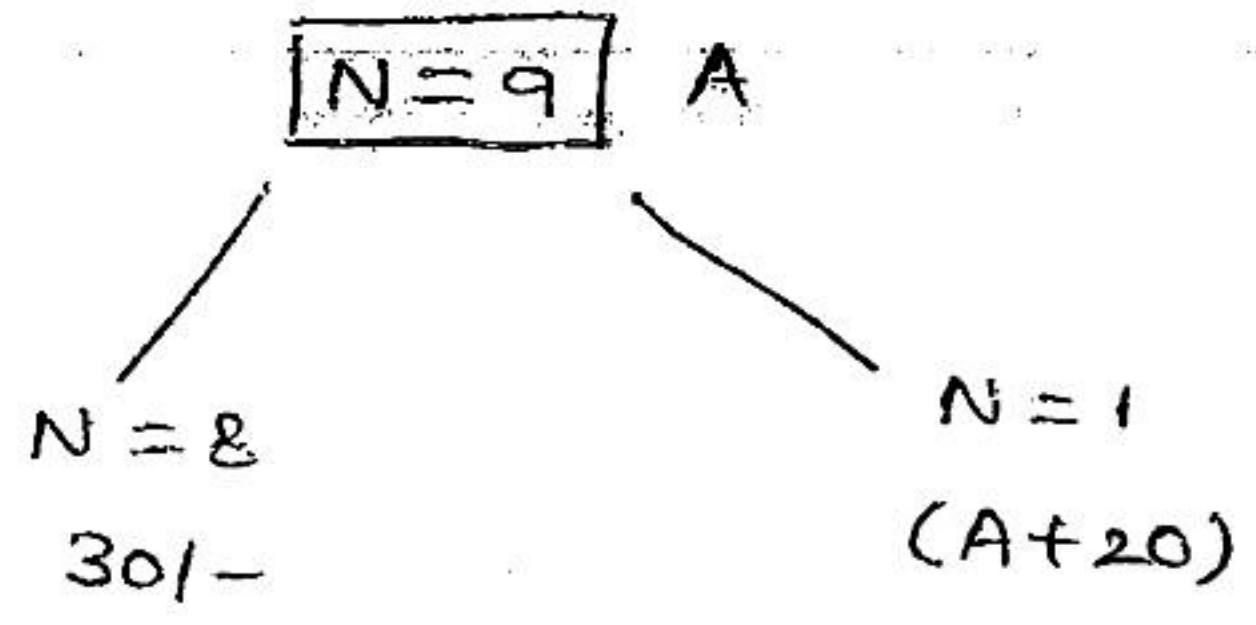
8 - Sunday₂
7

15 - S₃
7

22 - S₄
7

29 - S₅

3.



$$\frac{8 \times 30 + 1 \times (A+20)}{9} = A$$

$$A = \frac{260}{8}$$

$$= 32.50$$

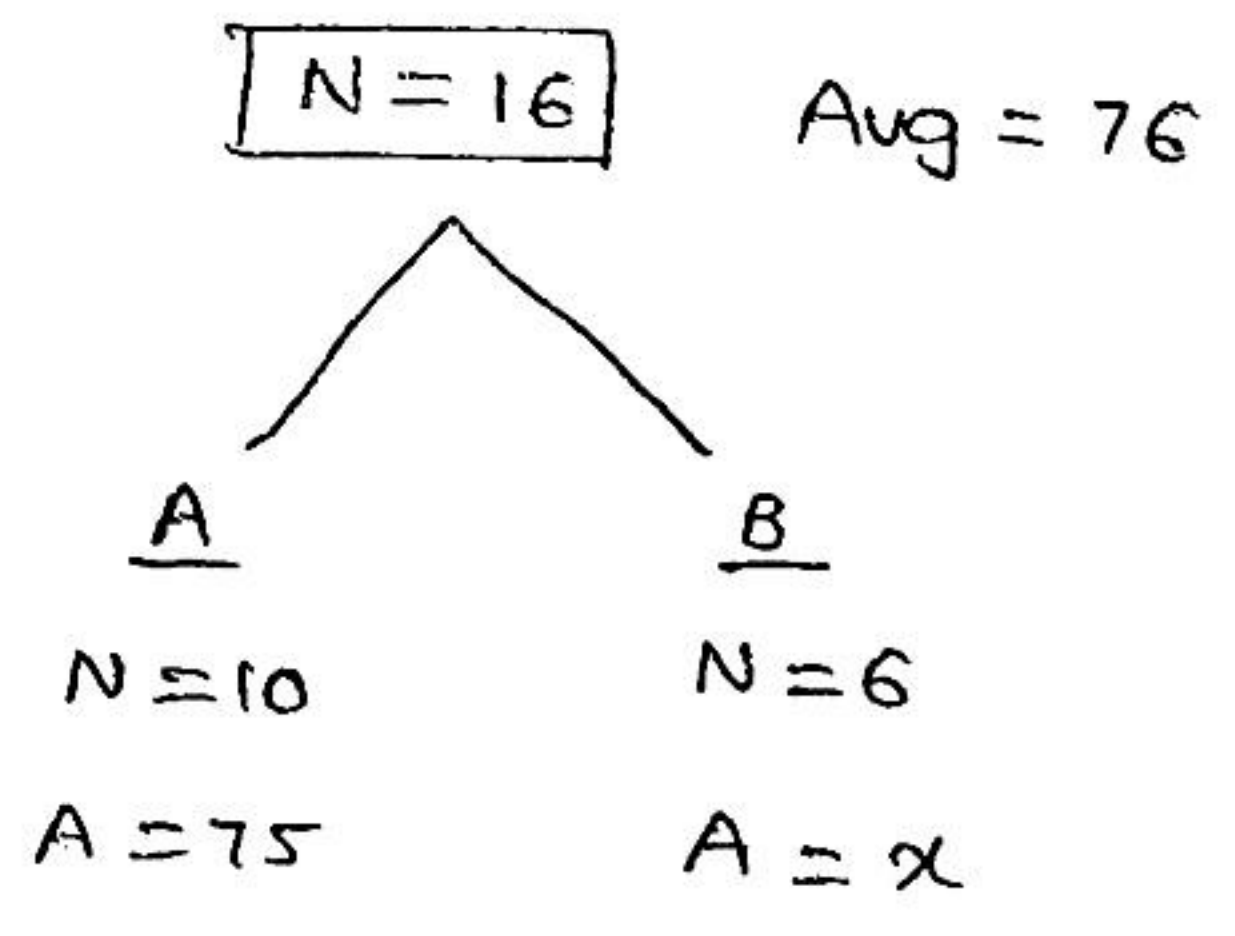
$$A = 32.50$$

$$\text{Sum} = A \times N$$

$$= 32.50 \times 9$$

$$= 292.50 \text{ RS.}$$

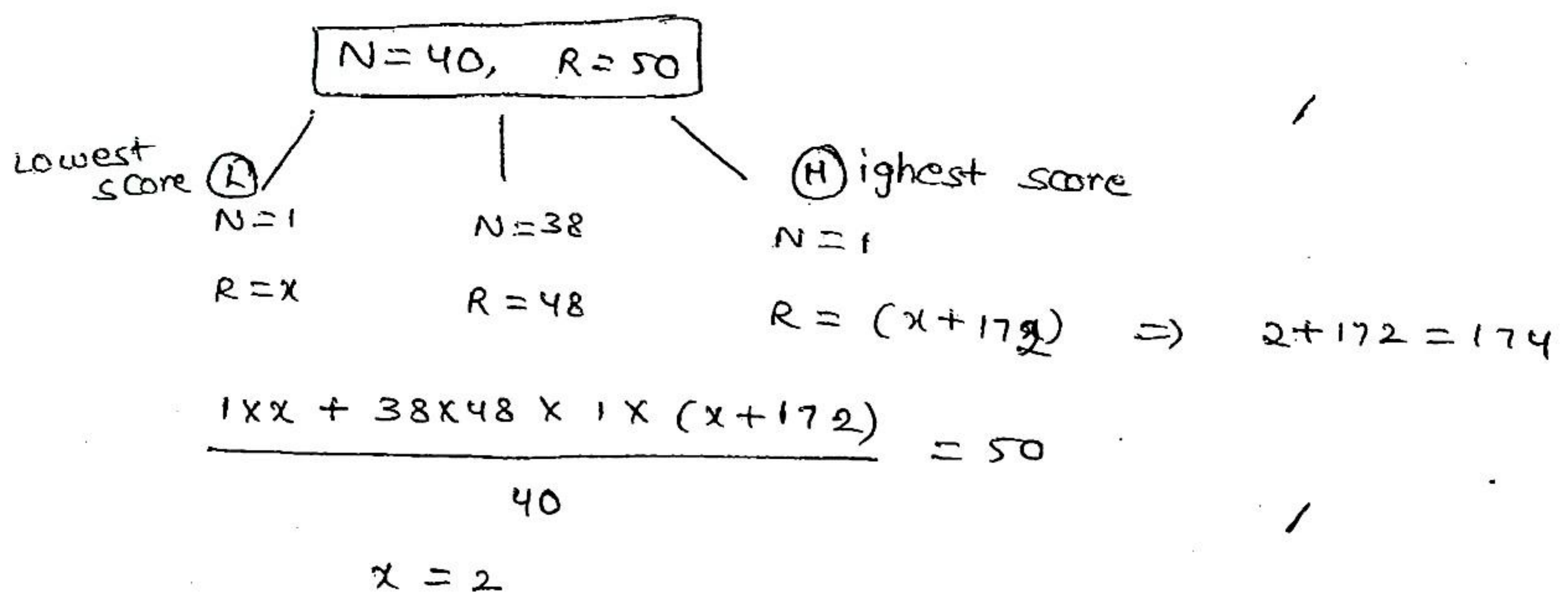
4.



$$\frac{75 \times 10 + 6 \times x}{16} = 76$$

$$x = 77 \frac{2}{3}$$

5.



$$\frac{1 \times x + 38 \times 48 + 1 \times (x+172)}{40} = 50$$

$$x = 2$$

6.

$$\left(\frac{I+II}{2} \right) - \left(\frac{II+III}{2} \right) = 15$$

$$\frac{I+II-II+III}{2} = 15$$

7. $\frac{1^{st} \text{ day}}{7} : \frac{5^{th} \text{ day}}{8}$

$1, 2, 3, 4 \rightarrow A = 58, \text{ sum} = 4 \times 58 = 232$

$2, 3, 4, 5 \rightarrow A = 60, \text{ sum} = 4 \times 60 = 240$

$1^{st} - 5^{th} = -8$

$5^{th} - 1^{st} = 8$

$8 \times 8^\circ = 64^\circ$

8. $N = 36 \rightarrow A = 17 \text{ years}$

Teacher $\leftarrow T = +1 \rightarrow A = +1$

$N = 37$ $A = 18 \text{ years}$

Summation of Teachers (S_T) $= 37 \times 18 = 666 \text{ years}$

Summation of Students (S_S) $(-) = 612 \text{ years}$

$54 \text{ years} = \text{Teacher's age}$

Note:-

17 years (Avg age)

+

37 years (Teacher added to group)

54 years

Level - 2 :-

1. $35 \rightarrow 1800$

$125 \times 36 \rightarrow 4500$

6300

3. $N = 11$ A

C W $N = 9$

$N = 1$ $N = 1$ $(A - 1)$

26 yrs 29 yrs

$1 \times 26 + 1 \times 29 + 9(A - 1) = A$

11

$A = 23 \text{ years}$

4. $N = 45, A = 52 \text{ kg}$ $+ \frac{2}{3} = 52 - \frac{2}{3}$

$(-ve)$ $(+ve)$

$N = 5$ $N = 5$

$A = 48 \text{ kg}$ $A = 54 \text{ kg}$

$5 \times 6 = \frac{30}{45} = \frac{2}{3}$

5.

$$(A, B, C) = 84 \text{ kg}$$

$$(ABCD) = 80 \text{ kg}$$

$$(BCDE) = 79 \text{ kg}$$

$$\begin{aligned} A+B+C &= 84 \times 3 \\ &= 252 \text{ kg} \end{aligned}$$

$$(-) \underline{177}$$

$$A = 75 \text{ kg}$$

$$\begin{aligned} A+B+C+D &= 80 \times 4 \\ &= 320 \text{ kg} \end{aligned}$$

$$(-) \underline{252}$$

$$D = 68 \text{ kg}$$

$$B+C+D+E = 79 \times 4$$

$$\begin{array}{r} \downarrow \quad \downarrow \\ 68 \quad 71 \quad (-) 139 \end{array}$$

$$B+C = 177 \text{ kg}$$

$$6. \quad N = ? \quad A = 63$$

$$\hookrightarrow G = +20$$

$$H = +2$$

$$63 \times N + 20 + 2 = 65 \times N$$

$$2N = 22$$

$$N = 11$$

$$N = ? \quad A = 65$$